

**What is claimed is:**

1. (amended) Electroluminescence light emitting device having multilayer structure deposited on a transparent substrate comprising of

- an active light emitting layer,
- 5 - a hole injecting electrode,
- a hole transfer layer,
- an electron injecting electrode, and
- an electron transfer layer,

said active light emitting layer comprises of organic or organometallic materials, having a *locus* with good energy accepting properties and high light emitting efficiency embedded into a *periphery* with high electronic excitation and energy donating properties, collecting electron and hole charge carriers, producing excited states via the electron-hole recombination process followed by electronic excitation energy transfer from the periphery to the locus (*antenna effect*) and converting the energy into the emitting light, wherein

- said *locus* comprises of [the] lanthanide ions ( $\text{Ln}^{3+}$ ) in the 3+ oxidative states with electron structure and electron transitions selected such to determine required emitting wavelength with narrow spectral band,
- said *periphery* has hyperbranched dendrimer-like architecture having specific electronic structure providing efficient energy transfer from triplet level of the periphery, that is efficiently excited via electron-hole recombination, to 4f orbitals of the locus, and ensuring spatial separation of the light emitting locus centers preventing concentration self-quenching of their luminescence light emission (*shell-effect*).

2. Electroluminescence light emitting device of Claim 1, wherein said active light emitting layer comprises of light harvesting dendrimers, including dendrimers with pyrenyl and naphthyl groups on the periphery, phenylacetylene-

based dendrimers, porphyrin dendrimers bearing Frechet's poly(aryl ether) wedges, homonuclear  $\text{Ln}^{3+}$ -based dendrimers, dendrimers with four binuclear building blocks, dendrimers with bis(4-pyridine-2,6-dicarboxylic acid) derivatives, embedded in a highly conductive polymer matrix, such as poly-*p*-phenylene (PPP), poly-*p*-phenylenevinylene (PPV), poly-vinyl-carbazole (PVC) and their derivatives or in other conductive polymer matrixes, providing the electron-hole recombination on an external dendrimer shell with consequent energy transfer to said locus by one- or multi-step processes.

3. Electroluminescence light emitting device of Claim 1, wherein said active light emitting layer comprises of a  $\pi$ -electron dendrimer, such as. rubrene-doped N,N'-diphenyl-N,N'-bis(3-methylphenyl)-[1,1'-biphenyl]-4,4'-diamine (TPD), tris(8-quinolinato)aluminum, hyperbranched polycarbazole derivatives, cumarin-based hyperbranched polymers starting with 3-carboxycumarin, polyamide dendrimers containing electron-deficient 5-membered oxadiazole units, providing the electron-hole recombination inside the dendrimer with consequent energy transfer to said locus.

4. Electroluminescence light emitting device of Claim 1, wherein  $\text{Tb}^{3+}$  ions are used as said locus.

5. Electroluminescence light emitting device of Claim 1, wherein  $\text{Eu}^{3+}$  ions are used as said locus.

6. Electroluminescence light emitting device of Claim 1, wherein  $\text{Sm}^{3+}$  ions are used as said locus.